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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
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1794	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/828,247	LEE ET AL.	
	Examiner	Art Unit	
	Marie R. Yamnitzky	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 March 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-21 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-21 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. This Office action is in response to applicant's amendment filed March 21, 2008, which amends claim 14. (The examiner notes that the status identifier for each of claims 15, 16, 19, 21 and 25 should be "Previously Presented" as no changes are made to these claims by the March 21st amendment.)

Claims 14-21 and 25 are pending.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. The rejections of claims 14 and 16-21 under 35 U.S.C. 112, 1st paragraph (written description and enablement) and 2nd paragraph, as set forth in the Office action mailed December 27, 2007 are overcome by claim amendment.

The rejection of claims 14, 19 and 21 under 35 U.S.C. 102(b) as anticipated by Igarashi et al. (US 2001/0019782 A1) as set forth in the December 27th action is overcome by claim amendment.

3. Claims 14, 15, 19, 21 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Okada et al. (US 2002/0055014 A1).

Okada's iridium complex represented by formula K-3 as shown on page 77 of the prior art is a complex of present formula L3M wherein M is Ir and L is represented by present Chemical Formula 9. The complex of formula K-3 is the compound represented by Chemical Formula 31 as shown in present claims 15 and 25. Okada's iridium complexes are disclosed for

use as a phosphorescent dopant in the emitting layer of an organic electroluminescent display device, and the device may have additional functional layers as required by present claim 19. For example, see paragraphs [0001]-[0012], [0192]-[0214] and [0217].

4. Claims 16-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. (US 2002/0055014 A1) as applied to claims 14, 15, 19, 21 and 25 above, and further in view of Park et al. (US 2003/0042848 A1) and Yu et al. (US 2004/0094768 A1).

Okada et al. disclose an iridium complex within the scope of the phosphorescent dopant required for present claim 14, teach that iridium complexes find use in color display devices, and teach that it is necessary to improve the light emission characteristics of blue, green and red light. Okada et al. do not explicitly disclose a display device having red, green and blue emitting layers meeting the limitations of present claims 16-18 and 20.

Park et al. and Yu et al. disclose full-color display devices having red, green and blue emitting layers in which at least one emitter is a phosphorescent emitter and at least one emitter is a fluorescent emitter. The blue emitting layer may be a fluorescent emitting layer. In Park's publication, for example, see Figures 4, 5 and 7-10, paragraphs [0013], [0018]-[0021], [0035]-[0040] and [0042]-[0051], and claims 1, 2, 8 and 9. In Yu's publication, for example, see Figures 1A-1E, 2A-2D and 3, and paragraphs [0001], [0037]-[0039], [0043]-[0045], [0048]-[0049] and [0059]-[0063]. The polymers taught in paragraph [0059] of Yu's publication are known fluorescent emitters.

Further with respect to the requirement of claim 20 for a hole blocking layer, Park et al. teach the use of a hole blocking layer over the phosphorescent emitter layers. For example, see paragraphs [0037] and [0040]. Note that paragraph [0040] implies that the red and green emitter layers, instead of the red and blue emitter layers, may be the phosphorescent emitter layers. Yu et al. also teach that an electron injection/transport layer may be deposited over each of the red, green and blue emitter layers, and materials taught in paragraph [0063] for the electron injection/ transport layer include materials known in the art to provide a hole blocking function.

Further with respect to the requirement of 18 that the blue fluorescent emitting layer be formed on an upper part of red and green phosphorescent emitting layers, Yu et al. teach that the blue emitter layer may be formed over the red and green emitter layers. For example, see paragraph [0048].

A phosphorescent dopant as defined in present independent claim 14 was known in the art at the time of the invention for use in an organic electroluminescent display device as demonstrated by Okada et al. The further structural features of the device as required by present claims 16-18 and 20 were known in the art for full-color organic electroluminescent display devices comprising a phosphorescent dopant as demonstrated by Park et al. and Yu et al. It would have been obvious to one of ordinary skill in the art at the time of the invention to make a full-color display device using a phosphorescent dopant as taught by Okada et al. utilizing structural features known in the art of full-color display devices such as those disclosed by Park et al. and Yu et al.

5. Claims 14, 15, 19, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Igarashi et al. (US 2001/0019782 A1).

Igarashi et al. disclose iridium complexes for use in the emitting layer of an organic electroluminescent display device. The device may have additional functional layers as required by present claim 19. For example, see paragraphs [0002]-[0010], [0135] and [0137].

Igarashi et al. do not explicitly disclose iridium complexes of formula L3M wherein L is represented by present Chemical Formula 4 or 9 (i.e. the iridium complexes of Chemical Formula 26 or 31 as in present claims 15 and 25), but such complexes are within the scope of Igarashi's iridium complexes and are similar to specific complexes disclosed in the prior art. Chemical Formula 4 and 9 provide naphthylpyridine ligands.

In paragraph [0043], Igarashi et al. teach that the orthometalating ligands of the iridium complexes may be aryl group-substituted nitrogen-containing heterocyclic derivatives wherein the aryl group may be naphthyl and the nitrogen-containing heterocycle may be pyridine. Igarashi's iridium complex of formula (1-62) is a complex of formula L3M wherein L is similar to the ligand provided by present Chemical Formula 4, differing in that the pyridine ring of the 1-naphthylpyridine ligand of formula (1-62) is substituted with a cyano group whereas Chemical Formula 4 provides an unsubstituted 1-naphthylpyridine ligand. Igarashi's iridium complex of formula (1-60) is a complex of formula L3M wherein L is similar to the 2-naphthylpyridine ligand provided by present Chemical Formula 9, differing in that the pyridine ring is fused to a benzene ring thereby forming a naphthylisoquinoline ligand.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make and use various iridium complexes within the scope of Igarashi's disclosure and similar in chemical structure to specific complexes disclosed by Igarashi with the expectation that such complexes would be light-emissive and suitable for the purposes taught by the prior art. One of ordinary skill in the art at the time of the invention would have reasonably expected that a complex similar to (1-62) but lacking the cyano substituent would be suitable for Igarashi's purposes since substituents are optional for the orthometalating ligands. One of ordinary skill in the art at the time of the invention would have reasonably expected that a complex similar to (1-60) but having an unsubstituted pyridine ring in place of the isoquinoline ring system would also be suitable for Igarashi's purposes given Igarashi's teachings such as in paragraph [0043].

6. Claims 16-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Igarashi et al. (US 2001/0019782 A1) as applied to claims 14, 15, 19, 21 and 25 above, and further in view of Park et al. (US 2003/0042848 A1) and Yu et al. (US 2004/0094768 A1).

Igarashi et al. teach that the iridium complexes find use in color display devices, and teach that it is necessary to improve the properties of blue, green and red light-emitting devices in order to develop high performance color displays. Igarashi et al. do not explicitly disclose a display device having red, green and blue emitting layers meeting the limitations of present claims 16-18 and 20.

Park et al. and Yu et al. disclose full-color display devices having red, green and blue emitting layers in which at least one emitter is a phosphorescent emitter and at least one emitter is a fluorescent emitter. The blue emitting layer may be a fluorescent emitting layer. In Park's publication, for example, see Figures 4, 5 and 7-10, paragraphs [0013], [0018]-[0021], [0035]-[0040] and [0042]-[0051], and claims 1, 2, 8 and 9. In Yu's publication, for example, see Figures 1A-1E, 2A-2D and 3, and paragraphs [0001], [0037]-[0039], [0043]-[0045], [0048]-[0049] and [0059]-[0063]. The polymers taught in paragraph [0059] of Yu's publication are known fluorescent emitters.

Further with respect to the requirement of claim 20 for a hole blocking layer, Park et al. teach the use of a hole blocking layer over the phosphorescent emitter layers. For example, see paragraphs [0037] and [0040]. Note that paragraph [0040] implies that the red and green emitter layers, instead of the red and blue emitter layers, may be the phosphorescent emitter layers. Yu et al. also teach that an electron injection/transport layer may be deposited over each of the red, green and blue emitter layers, and materials taught in paragraph [0063] for the electron injection/transport layer include materials known in the art to provide a hole blocking function.

Further with respect to the requirement of 18 that the blue fluorescent emitting layer be formed on an upper part of red and green phosphorescent emitting layers, Yu et al. teach that the blue emitter layer may be formed over the red and green emitter layers. For example, see paragraph [0048].

Igarashi et al. suggest phosphorescent dopants as defined in present independent claim 14 for use in an organic electroluminescent display device. The further structural features of the

device as required by present claims 16-18 and 20 were known in the art for full-color organic electroluminescent display devices comprising a phosphorescent dopant as demonstrated by Park et al. and Yu et al. It would have been obvious to one of ordinary skill in the art at the time of the invention to make a full-color display device using phosphorescent dopants suggested by Igarashi et al. utilizing structural features known in the art of full-color display devices such as those disclosed by Park et al. and Yu et al.

7. Applicant's arguments filed March 21, 2008 with respect to the rejections under 35 U.S.C. 103(a) based on Igarashi et al., and Igarashi et al. in view of Park et al. and Yu et al., have been fully considered but they are not persuasive.

Applicant argues that Igarashi does not describe the ligands of present formulae 4 or 9 or the complexes of present formulae 26 or 31, and that Igarashi would not have suggested these particular complexes. Applicant argues that paragraph [0043] of Igarashi generically describes a virtually limitless number of possible complexes, and nothing in the description would lead to the complexes of the present claims. With respect to Igarashi's specific complexes of formulae (1-60) and (1-62), applicant argues that a variety of alterations and substitutions could be made. Applicant argues that, absent a specific teaching leading to the complexes required by the present claims, it is irrelevant whether a person skilled in the art would expect the claimed complexes to be light-emissive and suitable for Igarashi's purposes.

While the teachings in paragraph [0043], considered in a vacuum, would not necessarily lead one directly to iridium complexes having three identical naphthylpyridine ligands as in the

complexes of present formulae 26 and 31, the teachings of the prior art as a whole would lead to such complexes. Igarashi provides a specific example of a complex that is similar in chemical structure to the complex of present formula 26 (Igarashi's (1-62)), and a specific example of a complex that is similar in chemical structure to the complex of present formula 31 (Igarashi's (1-60)). The complexes of present formulae 26 and 31 are used for the same purpose as the complexes taught by Igarashi. Motivation to make compounds that are similar in chemical structure lies in the expectation that compounds similar in structure will have similar properties. With respect to the complexes of Igarashi's formula (1-62) versus present formula 26, the only difference between the complexes is the cyano substituent in (1-62) versus the lack of substitution in 26. Based on Igarashi's teachings as a whole, one of ordinary skill in the art at the time of the invention would clearly recognize that substituents on the orthometalating ligand are optional. Based on Igarashi's teachings as a whole, one of ordinary skill in the art at the time of the invention would be motivated to make various complexes having unsubstituted ligands taught and suggested by Igarashi, and substituted derivatives thereof. Given Igarashi's teachings in paragraph [0043] and the specific example of the complex of formula (1-62), one would be motivated to make a similar complex having three unsubstituted naphthylpyridine ligands. Regardless of whether Igarashi's formula (1-62) would motivate one of ordinary skill to make other complexes having three substituted naphthylpyridine ligands other than cyano-substituted naphthylpyridine ligands, the examiner maintains the position that the prior art disclosure of the complex of formula (1-62) would lead one of ordinary skill in the art to the chemically similar

structure of present formula 26 having three unsubstituted naphthylpyridine ligands. Likewise, the examiner maintains the position that Igarashi's disclosure renders obvious the complex of present formula 31.

While the examiner maintains that the complex of formula 31, and a device comprising the complex of formula 31, would have been obvious to one of ordinary skill in the art given Igarashi's disclosure, the examiner also recently discovered that the complex of present formula 31 is explicitly disclosed in the patent application publication of Okada et al., which was published more than one year prior to present applicant's U.S. filing date. New rejections based on the disclosure of Okada et al. are set forth in this action, and the action is not made final.

8. Miscellaneous:

As a grammatical correction, --is-- should be inserted after "L" in line 9 of claim 14.

9. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/
Primary Examiner, Art Unit 1794

MRY
June 19, 2008